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| 09/942,611      | 08/31/2001  | Tsuyoshi Tanaka      | 520.40578X00        | 7496             |

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EXAMINER

ALI, SYED J

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2127

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/942,611

Applicant(s)

TANAKA ET AL.

Examiner

Syed J Ali

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2001.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-24 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claims 1-24 are pending in this application.

#### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

4. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

#### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. **Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doing et al. (USPN 6,438,671) (hereinafter Doing) in view of Maergner et al. (USPN 6,651,125) (hereinafter Maergner).**

7. As per claim 1, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs (col. 5 lines 3-8); and

a reallocation section for dynamically changing allocation of physical resources to said plurality of virtual computers (col. 21 lines 36-44).

8. Maergner teaches the invention as claimed, including:

a load monitor for monitoring load conditions of said virtual computers from an occupation rate of said CPUs in each of said plurality of virtual computers and/or a length of queue for execution of process in each of said plurality of said virtual computers (col. 4 lines 36-49; col. 6 lines 16-20); and

a controller for searching physical resource allocation to said virtual computers based on load conditions obtained by said load monitor and for demanding reallocation to said reallocation section (col. 7 lines 10-14; col. 8 lines 6-14).

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9. It would have been obvious to one of ordinary skill in the art to combine Doing and Maergner since the method of partitioning taught by Doing addresses the need for reallocating resources, but does not set forth any specific methodology for reallocating resources. Doing's disclosure is limited to discussing how to provide hardware support for the hypervisor reallocation without mentioning specifically how the hypervisor determines that resources should be redistributed. Maergner fills in the gaps regarding how to reassign resources based on dynamic workload monitoring and reassignment of resources based on the changing workload. Maergner discusses at length various aspects of assigning resources to partitions and changing allocation to improve processing efficiency.

10. As per claim 2, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs (col. 5 lines 3-8); and

a hypervisor for controlling said virtual computers, and for dynamically conducting physical resource allocation to said plurality of virtual computers according to the monitoring condition (col. 21 lines 36-44).

11. Maergner teaches the invention as claimed, including:

each of the plurality of virtual computers having an OS for measuring an occupation rate of said CPUs and/or a length of queue for execution of process (col. 4 lines 36-49; col. 6 lines 16-20); and

monitoring load conditions of said plurality of virtual computers from information measured by said OS (col. 7 lines 10-14; col. 8 lines 6-14).

12. As per claim 3, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs (col. 5 lines 3-8); and

a hypervisor for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

13. Maergner teaches the invention as claimed, including:

each of the plurality of virtual computers having an OS for measuring an occupation rate of said CPUs and/or a length of queue for execution of process (col. 4 lines 36-49; col. 6 lines 16-20); and

a monitoring section operating on a first virtual computer among said plurality of virtual computers for acquiring information measured by OS operating on a second virtual computers among said plurality of virtual computers, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

14. As per claim 4, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of physical computers having one or more CPUs (col. 1 line 64 - col. 2 line 7);

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a plurality of virtual computers composed on a first physical computers amongst said plurality of physical computers, the virtual computers operating on the physical computer (col. 5 lines 3-8); and

a hypervisor operating on the first physical computer for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

15. Maergner teaches the invention as claimed, including:

each of the plurality of virtual computers having an OS for measuring an occupation rate of said CPUs and/or a length of queue for execution of process (col. 4 lines 36-49; col. 6 lines 16-20); and

a monitoring section operating on a second physical computer among said plurality of physical computers for acquiring information obtained by OS operating on said first physical computer, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

16. As per claim 5, Maergner teaches the invention as claimed, including a virtual computer system according to claim 2, wherein said OS can increase or decrease CPUs under operating state (col. 10 lines 40-52).

17. Doing teaches the invention as claimed, including said hypervisor conducts process to increase or decrease the number of operating CPUs based on said measured information (col. 12 lines 53-64).

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18. As per claim 6, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating having one or more CPUs (col. 5 lines 3-8); and  
a reallocation section for dynamically changing allocation of physical resources to said plurality of virtual computers (col. 21 lines 36-44).

19. Maergner teaches the invention as claimed, including:

a load monitor for monitoring load conditions of said virtual computers from operating condition of said CPUs in each of said plurality of virtual computers (col. 4 lines 36-49; col. 6 lines 16-20); and

a controller for searching physical resource allocation to said virtual computers based on load conditions obtained by said load monitor, and for demanding reallocation to said reallocation section, the reallocation including an increase/decrease of the number of the operating CPUs (col. 7 lines 10-14; col. 8 lines 6-14).

20. As per claim 7, Maergner teaches the invention as claimed, including a virtual computer according to claim 1, wherein said controller generates a reallocation policy which increases a ratio of CPU allocation time offering to a virtual computer having high load from another virtual computer depending on CPU occupation rate of the other virtual computer (col. 9 line 53 - col. 10 line 17).

21. As per claim 8, Doing teaches the invention as claimed, including a virtual computer system, comprising:



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a plurality of virtual computers operating on a physical computer having one or more CPUs and main memory device (col. 5 lines 3-8); and

a reallocation section for dynamically changing allocation of physical resources to said plurality of virtual computers (col. 21 lines 36-44).

22. Maergner teaches the invention as claimed, including:

a load monitor for monitoring load conditions of said virtual computers from load condition of said main memory device in each of said plurality of virtual computers (col. 4 lines 36-49; col. 6 lines 16-20); and

a controller for searching physical resource allocation to said virtual computers based on load conditions obtained by said load monitor, and for demanding reallocation to said reallocation section (col. 7 lines 10-14; col. 8 lines 6-14).

23. As per claim 9, Maergner teaches the invention as claimed, including a virtual computer system according to claim 8, wherein the load conditions of said main memory device is obtained by frequency of paging and/or swap, and said reallocation section dynamically changes allocation amount of areas to said virtual computer of said main memory (col. 9 line 53 - col. 10 line 17).

24. As per claim 10, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs and a main memory device (col. 5 lines 3-8); and

a hypervisor controlling said virtual computers (col. 21 lines 36-44), and for dynamically conducting physical resource allocation to said plurality of virtual computers according to the monitoring condition (col. 21 lines 36-44).

25. Maergner teaches the invention as claimed, including:

each of the plurality of virtual computers having an OS for measuring load conditions of said main memory device (col. 4 lines 36-49; col. 6 lines 16-20); and

monitoring load conditions of said plurality of virtual computers from information measured by said OS (col. 7 lines 10-14; col. 8 lines 6-14).

26. As per claim 11, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs and a main memory device (col. 5 lines 3-8); and

a hypervisor for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

27. Maergner teaches the invention as claimed, including:

each of the plurality of virtual computers having an OS for measuring load conditions of said main memory device (col. 4 lines 36-49; col. 6 lines 16-20); and

a monitoring section operating on a first virtual computer among said plurality of virtual computers for acquiring information obtained by OS operating on a second virtual computers among said plurality of virtual computers, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

28. As per claim 12, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of physical computers having one or more CPUs and a main memory device (col. 1 line 64 - col. 2 line 7);

a plurality of virtual computers composed on a first physical computers amongst said plurality of physical computers, the virtual computers operating on the physical computer (col. 5 lines 3-8); and

a hypervisor operating on a first physical computer for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

29. Maergner teaches the invention as claimed, including:

each of the plurality of virtual computers having an OS for measuring load conditions of said main memory device (col. 4 lines 36-49; col. 6 lines 16-20); and

a monitoring section operating on a second physical computer among said plurality of physical computers for acquiring information measured by OS operating on said first physical computers, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

30. As per claim 13, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs, each of said plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a reallocation section for dynamically changing allocation of physical resources to said plurality of virtual computers (col. 21 lines 36-44).

31. Maergner teaches the invention as claimed, including:

a load monitor for monitoring load conditions of said virtual computers from response time process of said virtual computers from response time of a process of said application program in each of said plurality of virtual computers (col. 4 lines 36-49; col. 6 lines 16-20); and

a controller for searching physical resource allocation to said virtual computers based on load conditions obtained by said load monitor and for demanding reallocation to said reallocation section (col. 7 lines 10-14; col. 8 lines 6-14).

32. As per claim 14, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs, each of said plurality of virtual computers having one or more CPUs, each of said plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a hypervisor for controlling said virtual computers (col. 21 lines 36-44), and for dynamically conducting physical resource allocation to said plurality of virtual computers according to the monitoring condition (col. 21 lines 36-44).

33. Maergner teaches the invention as claimed, including:

monitoring load conditions of said plurality of virtual computers from response time of process obtained from said application program (col. 7 lines 10-14; col. 8 lines 6-14).

34. As per claim 15, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs, each of the plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a hypervisor for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

35. Maergner teaches the invention as claimed, including:

a monitoring section operating on a first virtual computer among said plurality of virtual computer for acquiring response time of process obtained by said application program operating on second virtual computers among said plurality of virtual computers, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

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36. As per claim 16, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of physical computers having one or more CPUs (col. 1 line 64 - col. 2 line 7);

a plurality of virtual computers composed on a first physical computers amongst said plurality of physical computers, the virtual computers operating on the physical computer, each of the plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a hypervisor operating on the first physical computer for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

37. Maergner teaches the invention as claimed, including:

a monitoring section operating on a second physical computer among said plurality of physical computers for acquiring response time of process of the application program operating on said first physical computer, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

38. As per claim 17, Maergner teaches the invention as claimed, including a virtual computer system according to claim 13, wherein said load condition monitoring section issues transaction to the application program, and monitors load conditions of said virtual computers based on a time required to complete said transaction (col. 9 line 53 - col. 10 line 17).

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39. As per claim 18, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs, each of said plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a hypervisor for controlling said virtual computers, for issuing transactions to said application program (col. 21 lines 36-44), and for dynamically conducting physical resource allocation to said plurality of virtual computers according to the monitoring condition (col. 21 lines 36-44).

40. Maergner teaches the invention as claimed, including:

monitoring load conditions of said plurality of virtual computers from response time of process obtained by monitoring a time required to complete the transaction (col. 4 lines 36-49; col. 6 lines 16-20; col. 7 lines 10-14; col. 8 lines 6-14).

41. As per claim 19, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs, each of the plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a hypervisor for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

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42. Maergner teaches the invention as claimed, including:

a monitoring section operating on a first virtual computer among said plurality of virtual computer for acquiring response time of process obtained by monitoring a time required to complete transaction issued to said application program operating on a second virtual computers among said plurality of virtual computers, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).

43. As per claim 20, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of physical computers having one or more CPUs (col. 1 line 64 - col. 2 line 7);

a plurality of virtual computers composed on a first physical computers amongst said plurality of physical computers, the virtual computers operating on the physical computer, each of the plurality of virtual computers having an OS for controlling execution of an application program (col. 5 lines 3-8); and

a hypervisor operating on the first physical computer for controlling said plurality of virtual computers, the hypervisor having a reallocation section for dynamically changing physical resource allocation to said plurality of virtual computers (col. 21 lines 36-44).

44. Maergner teaches the invention as claimed, including:

a monitoring section operating on a second physical computer among said plurality of physical computers for acquiring time required to complete transaction issued the application program operating on said first physical computer, and for demanding reallocation to said reallocation section based on the information (col. 7 lines 10-14; col. 8 lines 6-14).



45. As per claim 21, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer having one or more CPUs (col. 5 lines 3-8); and

a means for implementing said plurality of actions sequentially and for conducting physical resource reallocation according to contents of actions having effectiveness for lowering the load (col. 21 lines 36-44).

46. Maergner teaches the invention as claimed, including:

a load monitor for monitoring load conditions of said plurality of virtual computers (col. 4 lines 36-49; col. 6 lines 16-20); and

a storing section for storing contents of a plurality of actions for changing physical resources allocated to virtual computers judged as high load by said load monitor (col. 7 lines 10-14; col. 8 lines 6-14).

47. As per claim 22, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer (col. 5 lines 3-8); and

a reallocation section for dynamically allocating physical resources of said physical computer to said plurality of virtual computers (col. 21 lines 36-44).

48. Maergner teaches the invention as claimed, including:

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a load monitor for collecting load of at least one of said virtual computers with a fixed interval and for detecting periodic changes of collected load data (col. 4 lines 36-49; col. 6 lines 16-20); and

a controller for determining said physical resource allocation based on said periodic change of the load and for demanding periodical allocation of physical resources to said reallocation section (col. 7 lines 10-14; col. 8 lines 6-14).

49. As per claim 23, Doing teaches the invention as claimed, including a virtual computer system, comprising:

a plurality of virtual computers operating on a physical computer (col. 5 lines 3-8); and

a reallocation section for dynamically allocating physical resources of said physical computer to said plurality of virtual computers (col. 21 lines 36-44).

50. Maergner teaches the invention as claimed, including:

a controller for deciding a priority order of allocation of physical resources to each virtual computers in said reallocation section according to customers and agreement conditions (col. 7 lines 10-14; col. 8 lines 6-14).

51. As per claim 24, Maergner teaches the invention as claimed, including a virtual computer system according to claim 23, wherein said controller has a reference to judge different overload according to customers and agreement conditions for every virtual computers (col. 7 lines 10-14; col. 8 lines 6-14).

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***Conclusion***


52. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Syed Ali  
November 9, 2004



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